

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

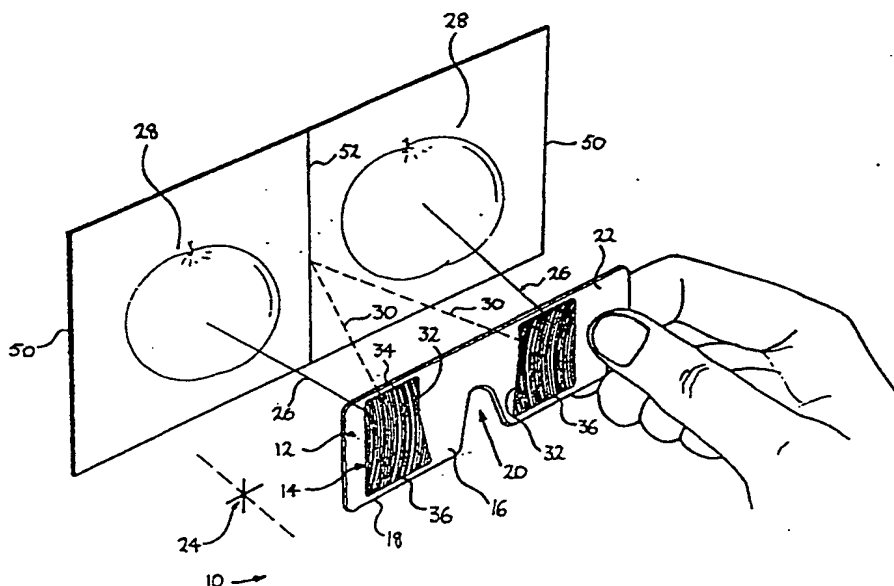


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G02B 27/22, G03B 35/24		A1	(11) International Publication Number: WO 96/37799
			(43) International Publication Date: 28 November 1996 (28.11.96)
(21) International Application Number: PCT/AU96/00313 (22) International Filing Date: 23 May 1996 (23.05.96) (30) Priority Data: PN 3145 24 May 1995 (24.05.95) AU PN 6577 15 August 1995 (15.08.95) AU (71)(72) Applicant and Inventor: FLETCHER, Malcolm, Henry [AU/AU]; 21 King Street, East Fremantle, W.A. 6158 (AU). (74) Agents: HARWOOD, Errol, John et al.; Wray & Associates, 239 Adelaide Terrace, Perth, W.A. 6000 (AU).			(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KF, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).
			Published With international search report.

1, 2, 3, 4, 5, 6, ~~7, 8, 9~~
24, 25, 26, 27, 28.

(54) Title: STEREOSCOPIC VIEWING DEVICE



(57) Abstract

A stereoscopic viewing device (10) for viewing a pair of images (28) to form a stereoscopic image, such device comprising a pair of substantially flat lenses (14) arranged in a support means (12), the lenses being arranged to allow viewing therethrough by a pair of eyes of a user, the support means (12) having a recess (20) provided therein to accommodate the nose of the user and also having provided thereon an opaque barrier means (16) to prevent viewing of images not contributing to the stereoscopic image.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LI	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

TITLE

"STEREOSCOPIC VIEWING DEVICE"

5 FIELD OF THE INVENTION

THIS INVENTION relates to a stereoscopic viewing device. More particularly, the stereoscopic viewing device of the present invention is intended for use in viewing full colour stereo-pair images to provide a full colour three-dimensional
10 image.

DISCUSSION OF THE PRIOR ART

The prior art relating to stereoscopic viewing techniques is comprised largely of
15 variations of the lorgnette stereo viewer which comprised a handle supporting both the lenses of the viewer and a pair of drawings or photographs. The pair of images allows the formation of a stereogram or stereograph when the pair comprises two images of the same subject printed as observed from slightly different angles or slightly spaced adjacent positions.

20

The nature of the majority of prior art stereoscopic viewing devices has required the very specific positioning of the pair of images to be viewed in relation to the lenses of the devices. A further characteristic of prior art devices containing conventional lenses is that the images viewed have been required to remain
25 small. This is due to the angle of displacement of the line of sight being directly related to the thickness of the lens used. Bigger images would require thicker lenses and a viewing device with such lenses would prove impractical. This fact has made the provision of books or other collections of full colour images impractical.

30

The stereogram or stereograph is generally created by the user's right eye being caused to view the right hand image and vice versa. This situation requires the

- 2 -

optical displacement of the images to be directed nasally such that the images "fuse" to provide the stereoscopic image. Typically, stereoscopic viewing devices have also required a means to prevent a user's left eye viewing a right hand image and vice versa. Such a means originally comprised a simple
5 opaque barrier extending from the lens to the image pair. Further, more recent devices have provided a frosted inner edge to the lenses used by the viewer. Whilst the later technique is far superior to the first cumbersome method it does not allow for differences in the interpupillary distances (I.P.D.'s) of users of the device. For example, a user having a particularly narrow I.P.D., perhaps a child,
10 will not be able to use the device effectively.

However, the stereogram or stereograph may also be viewed by the right eye being caused to view the left hand image and vice versa. This arrangement requires the displacement of the images to be temporarily directed to provide the
15 stereoscopic image through "fusing" of the left and right hand images. So as to prevent additional images being viewed by the viewer in this arrangement it is necessary to provide opaque barriers to the left and right of the left and right eyes, respectively.

20 The stereoscopic viewing device of the present invention has as one object thereof to overcome the problems associated with the prior art as set out above.

BRIEF DESCRIPTION OF THE INVENTION

25 The present invention provides a stereoscopic viewing device for viewing a pair of images to form a stereoscopic image, characterised by such device comprising a pair of substantially flat lenses arranged in a support means, the pair of lenses being arranged to allow viewing therethrough by a pair of eyes of a user, the support means having a recess provided therein to accommodate the
30 nose of the user and also having provided thereon an opaque barrier means to prevent viewing of images not contributing to the stereoscopic images.

The lenses of the stereoscopic viewing device of the present invention may be provided as a pair of Fresnel lenses. The Fresnel lenses may be provided with their optical axes set either wider or narrower than the standard interocular distance or I.P.D. Such an arrangement displaces the apparent positions of the
5 image pair nasally or temporally, respectively to form the required stereoscopic image.

An opaque barrier means is provided on the support means in which the Fresnel lenses are mounted. The barrier means is provided between the lenses if such
10 are arranged to displace the image pair nasally, whereas if the lenses are arranged to displace the image pair temporally the barrier means is provided in portions located temporally of each lens.

The support means may be provided in the form of a substantially planar
15 member. The Fresnel lenses may be integrally moulded in the support means as may the barrier means. It is preferably that the facets of the Fresnel lenses be oriented away from the user in use.

The vertical edges of the barrier means adjacent each lens is preferably tapered
20 such that the distance between an inner edge of the lenses vary where such are arranged to displace the image pair nasally. Further, the inner edge of each barrier means portion adjacent the lenses are preferably tapered where such are arranged to displace the image pair temporally.

25 The present invention further provides a stereoscopic viewing device in combination with a pair of images arranged side by side, characterised by the images being of substantially the same subject printed as observed from slightly different angles or slightly spaced adjacent positions.

30 Preferably, the image pair may be provided in the form of a post card having a surface provided on the rear thereof for writing and/or an address to be placed thereon. It is preferable that the Fresnel lenses be chosen to magnify the image

pair in such circumstances. Further, a plurality of image pairs may be provided in the form of a book or magazine.

DESCRIPTION OF THE DRAWINGS

5

The present invention will now be described, by way of example only, with reference to two specific embodiments of the present invention and the accompanying drawings, in which:

10 Fig. 1 is an upper perspective view of a stereoscopic viewing device in accordance with a first embodiment of the present invention, shown being used to view a pair of images;

 Fig. 2 is a front elevational view of the stereoscopic viewing device of Fig.
15 1; and

 Fig. 3 is a top plan view of the viewing device and images of Fig. 1.

DESCRIPTION

20

In Figs. 1 to 3 there is shown a stereoscopic viewing device 10 for viewing a pair of images to form a stereoscopic image, the device 10 comprising a support means, for example a substantially planar frame 12, a pair of magnifying Fresnel lenses 14 and an opaque barrier means 16.

25

The frame 12 has a lowermost edge 18 in which is provided a recess 20 proportioned to receive a user's nose (not shown). The recess 20 is provided substantially centrally with reference to the lenses 14. A gripping portion 22 to be gripped by a hand 23 of a user (not shown) is provided at one side of the

30 device 10.

- 5 -

The Fresnel lenses 14 are composed of a plurality of concentric circular elements or facets whose lenticular axes 24 are located temporally with respect to the lenses 14. Typical lines of sight 26 for the user through each lens 14 are shown directed to the individual images of the pair of images 28, best seen in
5 Figs. 1 and 3. However, the user views an apparent line of sight 30 whereby such are displaced nasally to produce the stereoscopic image. If the Fresnel lenses 14 were arranged such that their lenticular axes 24 were located nasally then the apparent lines of sight 30 would be displaced temporally.

10 The lenses 14 each have an inner edge 32 tapered such that the distance between the lenses 14 is greater at an upper edge 34 than it is at a lower edge 36. The barrier means 16 is at least provided between the edges 32, as is shown in both Figs. 1 and 2. Typically, the distance between the two lenses 14 is approximately 5 centimetres.

15

The tapered inner edges 34 of the lenses 14 allow the user to manipulate the cancellation of the displaced images by raising or lowering the device 10 vertically. Further, this feature allows the device 10 to be used by users having differing I.P.D.'s, particularly those with a narrow I.P.D., such as children.

20

The Fresnel lenses 14 of the device 10 have a tendency to distort the images 28. Accordingly, the images are preferably provided in a form whereby they are 5% larger at an outer edge 50 thereof compared to an inner edge 52. The distortion of the images 28 is typically substantially linear over their width. It has
25 been observed that such distortion is minimised by positioning the facets of the Fresnel lenses 14 away from the user.

The frame 12, lenses 14 and opaque barrier means of the device 10 of the present invention may each be formed of a single plastics material. Further, the
30 device 10 may be formed integrally as a single substantially planar moulding. In such an arrangement the barrier means 16 is preferably of a frosted finish being

substantially opaque. Further, the facets of the Fresnel lenses 14 are moulded into one surface of the device 10 in such an arrangement.

The use of Fresnel lenses in the device of the present invention allows the provision of a stereoscopic viewing device far smaller, lighter and cheaper than those provided previously containing conventional lenses. For example, a comparable device containing conventional lenses would require a lens of at least 6mm thickness and 15 cm focal length. The construction and composition of the device 10 of the present invention also allows same to be moulded in a single moulding thereby providing a further advantage over previous devices.

It is further envisaged that adjustable arm means for supporting and locating the device 10 on the ears and nose of the user in a manner similar to traditional spectacles may be provided. Such arm means may be provided integrally formed with or attachable to the frame 12 of the device 10. Such arms are preferably adjustable to allow each user to adjust the distance from their eyes to the lenses 14.

It is envisaged that whereas the inner edges 32 of the lenses 14 are tapered such that their upper edges 34 are further apart than their lower edges 36 the arrangement could be reversed and still remain within the scope of the present invention.

Modifications and variations such as would be apparent to the skilled addressee are considered to fall within the scope of the present invention.

- 7 -

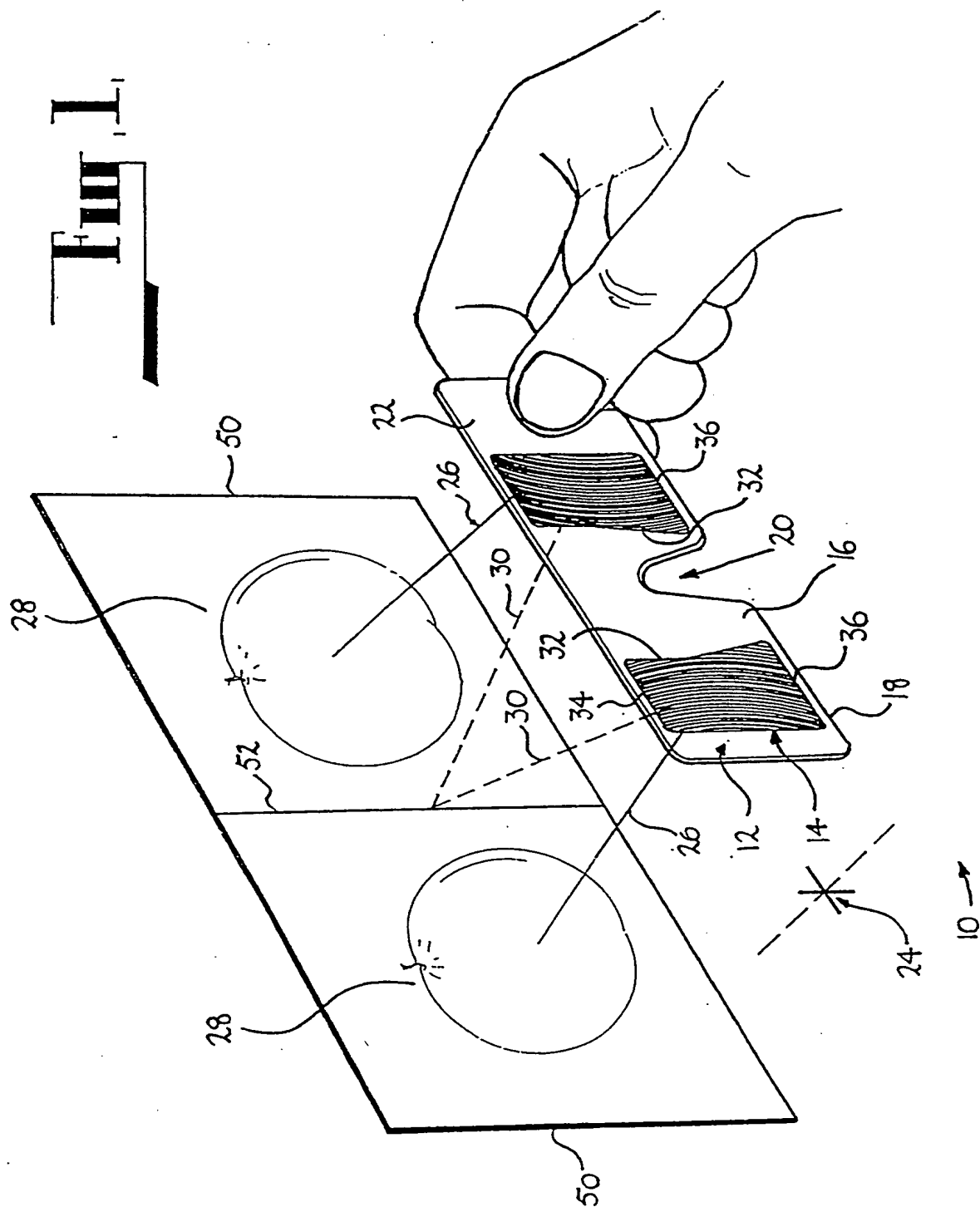
THE CLAIMS defining the invention are as follows:

1. A stereoscopic viewing device for viewing a pair of images to form a stereoscopic image, characterised by such device comprising a pair of
5 substantially flat lenses arranged in a support means, the lenses being arranged to allow viewing therethrough by a pair of eyes of a user, the support means having a recess provided therein to accommodate the nose of the user and also having provided thereon an opaque barrier means to prevent viewing of images not contributing to the stereoscopic image.
- 10 2. A stereoscopic viewing device according to claim 1, characterised in that the lenses comprise Fresnel lenses.
3. A stereoscopic viewing device according to claim 1 or 2, characterised in
15 that the barrier means comprises either a portion located between the lenses if such are arranged to displace the image pair nasally or in two portions each located temporally of each lens if such are arranged to displace the image pair temporarily and wherein the inner or outer vertical edges of the lenses respectively are tapered so as to allow quick adjustment of the displaced image
20 by the user.
4. A stereoscopic viewing device according to any one of the preceding claims, characterised in that the lenses and support means are integrally formed.
- 25 5. A stereoscopic viewing device according to claim 4, characterised in that the lenses and support means are moulded integrally from a plastics material.
6. A stereoscopic viewing device according to claim 4 or 5, characterised in
that the opaque barrier means comprises a frosted surface finish provided on the
30 support means.

7. A stereoscopic viewing device according to claim 6, characterised by the entire support means having a frosted surface finish.
8. A stereoscopic viewing device according to any one of the preceding
5 claims, characterised in that at least one gripping portion is provided on the support means for gripping by the user during use.
9. A stereoscopic viewing device according to any one of the preceding
10 claims, characterised in that one or more arms are provided associated with the support means to allow location of the device on the ears and nose of the user.
10. A stereoscopic viewing device according to claim 9, characterised by the
or each arm being adjustable in length so as to allow the user to adjust the
distance from the user's eyes to the lenses of the device.
15
11. A stereoscopic viewing device according to claims 8 to 10, characterised
in that a pair of the arms are provided hingedly attached to the support means in
a manner similar to traditional spectacles.
12. A stereoscopic viewing device according to any one of claims 2 to 11,
20 characterised in that the lenticular axes of the lenses are located temporally with
respect thereto.
13. A stereoscopic viewing device according to any one of claims 2 to 12,
25 characterised in that facets forming the Fresnel lenses are positioned away from
the eyes of the user in use.
14. A stereoscopic viewing device according to any one of claims 2 to 13,
characterised in that the Fresnel lenses are magnifying lenses.
30
15. A stereoscopic viewing device according to any one of the preceding
claims in combination with a pair of images arranged side by side, characterised

by the images being of substantially the same subject printed as observed from slightly different angles or slightly spaced adjacent positions.

16. A stereoscopic viewing device and image pair combination according to
5 claim 15, characterised in that the image pair is provided in the form of a post card having a surface provided on the rear thereof for writing and/or an address to be placed thereon.
17. A stereoscopic viewing device and image pair combination according to
10 claim 15, characterised in that a plurality of image pairs are provided in the form of a book or magazine.
18. A stereoscopic viewing device substantially as hereinbefore described with reference to the accompanying drawings.



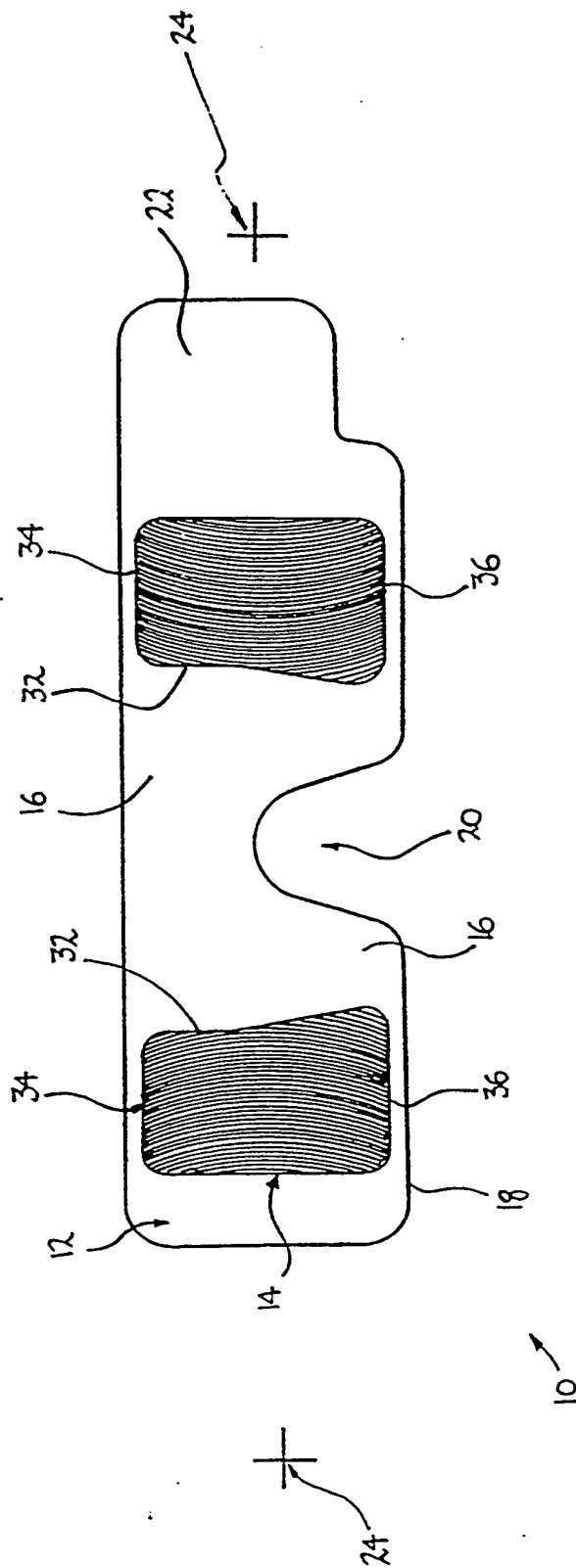
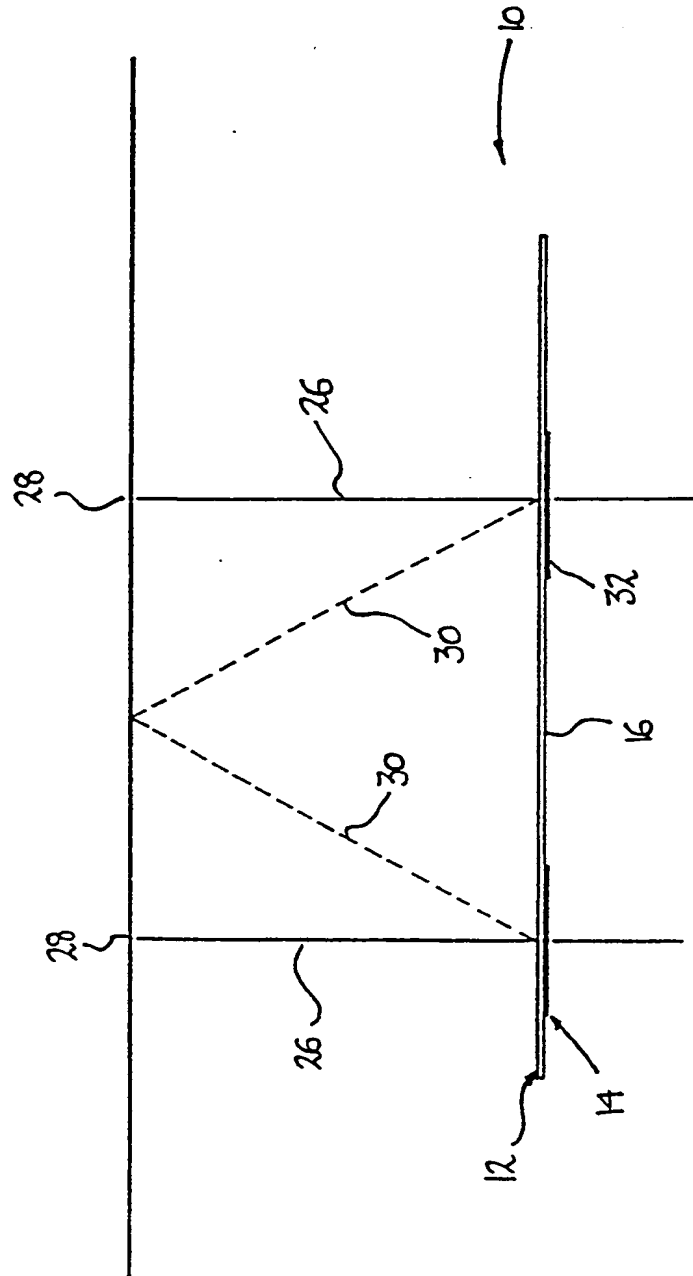


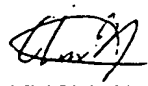
Fig. 2

Fig. 3



INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 96/00313

A. CLASSIFICATION OF SUBJECT MATTER												
Int Cl ⁶ : G02B 27/22 G03B 35/24												
According to International Patent Classification (IPC) or to both national classification and IPC												
B. FIELDS SEARCHED												
Minimum documentation searched (classification system followed by classification symbols) G02B 27/22												
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : G02B 27/22												
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DERWENT : STEREOSCOPIC AND (OPAQUE OR IMPERMEABLE OR OBSCURE OR BARRIER OR OBSTRUCT-) JAPIO : SAME AS DERWENT												
C. DOCUMENTS CONSIDERED TO BE RELEVANT												
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.										
X,Y	US 4893898 A (BEARD) 16 January 1990 see abstract, claim 1 and figure 1	1-17										
X,Y	US 4730898 A (CURTIN) 15 March 1988 see abstract and columns 5-6 and figure 1	1-17										
X,Y	WO 94/14285 A (DASSO) 23 June 1994 see abstract and figures 3, 6, 7	1-17										
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex												
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E" earlier document but published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E" earlier document but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention											
"E" earlier document but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone											
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art											
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family											
"P" document published prior to the international filing date but later than the priority date claimed												
Date of the actual completion of the international search 20 August 1996		Date of mailing of the international search report 26 AUG 1996										
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (06) 285 3929		Authorized officer R. CHAO  Telephone No.: (06) 283 2191										

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 96/00313

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,Y	FR 2550632 A (RADISSON) 15 February 1985 see whole document	1-17
X,Y	US 4986632 A (ECKMANN) 22 January 1991 see abstract, column 3 lines 49-61 and figures 9 and 11	1-17
X,Y	US 2528673 A (TAYLOR) 7 November 1950 see whole document	1-17
X,Y	US 4253732 A (CARVER) 3 March 1981 see abstract and figure 1	1-17
X,Y	Patent Abstracts of Japan, P1204, page 38, JP,A, 3-48810 (MATSUSHITA ELECTRIC IND CO LTD) 1 March 1991	1-17

Information on patent family members

PCT/AU 96/00313

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	4893898	AU	14029/88	BR	8801249	CA	1294801
		EP	325019	HK	944/91	JP	1205120
		SG	792/91	SU	1836648	US	4836647
WO	9414285	AU	58990/94	CA	2147987	US	5434613
US	4986632	US	4925270				